

## Gravity Investigations of Terrestrial impact Craters

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Terrestrial craters are often **difficult** to study due to their size, exposure, or preservation. Gravity **studies** provide a useful **technique** to determine diameter, central peak size, extent of terraces, **cavity** depth, and the extent local **crustal** disturbance. As an example, **results from studies** at Mt. Toondina and Connolly Basin Australia, and Maroon 10 are discussed. The residual Bouguer gravity field at Mt. Toondina **exhibits** a positive anomaly of  $\sim +1.0$  mGal coincident with the **central uplift** and a  $-0.5$  mGal low associated with the ring depression. Gravity modeling indicates relatively high-density material **has** been uplifted at least **200 m** in the central **uplift**; the ring depression is filled with low density sediments thickened by as much as 90 m. The uplift is  $\sim 1$  km diameter; the total structure has a diameter of  $\sim 4$  km. Connolly Basin has a Bouguer field that decreases to the northwest. After removal of a regional field, a high ( $+1.6$  to  $2.0$  mGal) is observed over the central **uplift**. Farther out at  $1.8$  to  $4.0$  km is a **high** ( $+0.3$  to  $0.5$  mGal) **separated from** the central high by an **annular low** ( $-0.3$  mGal)  $\sim 0.5$  km across. This **impact** can be modeled as 9 km in diameter with a central uplift and a crater filled with **impact** breccias and debris shed off the central uplift. At Maroon 10, the residual gravity **shows** a high surrounded by **lows** in turn surrounded by isolated highs. The center is **characterized by two positive** highs ( $+4$  mGal) which extend beyond the **area of shallow bedrock**. A ring of gravity lows ( $-2$  to  $-4$  mGal) surround the center and corresponding to the moat and terrace zones. The **gravity relief across** the structure is  $> 10$  mGal. A gravity signature resulting from the crater can be resolved, although it is subtle **and** partly overwhelmed by variations in the Precambrian basement.

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